

Issues for Consideration 2019 Technical Panel

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Technical Panel on Assumptions and Methods
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Overview

- **Forecasting Assumptions**
 - Uncertainty of transition periods
- **Key Variables**
 - Explicit and Implicit
- **Clarity and Relevance of Information**
 - Replacement rates, uncertainty of ultimate assumptions, Federal budget perspective
- **Other Topics to Consider**
 - Labor force participation, earnings inequality, fertility rates, taxation of benefits
- **Final Recommendations**
 - Comparison and evaluation

Three Questions of Forecasting:

- Where are we now?
 - Above or below historical trend or ultimate assumption
- Where are we going?
 - Short-run: Return to trend or assume cyclical effects
 - Long-run: Ultimate level or rate of change
- How long to get there?
 - Fixed or variable time period
 - Fixed or variable rate of convergence

Transition Periods Vary By Assumption

(Figures in Red are Ultimate Assumptions)

		Immigration										
	Fertility Rate	Net LPR	Net Other	Labor Productivity (Output per Hour)	Total Labor Compensation as Share of GDP	Average Hours Worked (% Chg)	GDP Deflator (% Chg)	CPI-W (% Chg)	Unemployment Rate	Real GDP (% Chg)	Nominal Interest Rate	Real Interest Rate
2017	1.80	863	769	1.10	60.5%	-0.07	1.81	2.13	4.40	2.20	2.30	-0.30
2018	1.81	825	853	1.72	60.8%	-0.06	1.97	2.23	4.40	2.70	2.70	0.10
2019	1.82	788	832	1.71	61.1%	0.01	2.06	2.50	4.90	2.60	3.40	0.20
2020	1.84	788	710	1.72	61.4%	0.01	2.20	2.60	5.30	2.60	3.90	0.80
2021	1.86	788	697	1.73	61.7%	0.00	2.20	2.60	5.50	2.50	4.30	1.30
2022	1.90	788	586	1.72	62.0%	0.00	2.20	2.60	5.50	2.40	4.60	1.70
2023	1.94	788	577	1.72	62.3%	0.00	2.20	2.60	5.50	2.40	4.90	2.00
2024	1.97	788	570	1.71	62.5%	-0.01	2.20	2.60	5.50	2.40	5.10	2.30
2025	1.99	788	562	1.68	62.8%	-0.03	2.20	2.60	5.50	2.30	5.20	2.50
2026	2.00	788	556	1.68	63.0%	-0.05	2.20	2.60	5.50	2.20	5.30	2.60
2027	2.00	788	550	1.68	63.1%	-0.05	2.20	2.60	5.50	2.20	5.30	2.70
2028	2.00	788	544	1.68	63.1%	-0.05	2.20	2.60	5.50	2.20	5.30	2.70
2029	2.00	788	539	1.68	63.1%	-0.05	2.20	2.60	5.50	2.10	5.30	2.70
2030	2.00	788	533	1.68	63.1%	-0.05	2.20	2.60	5.50	2.10	5.30	2.70

Transitions: Using historical data to fit models

PRO

- No need to define length of transition period arbitrarily.
- The forecast is based on historical movements in variables of interest.
- Uncertainty about future is based on variability observed in the past (moving average, vector auto-regression, stochastic)

CON

- Historical values may not reflect the most likely future outcomes (e.g. 1946-64 baby-boom and 1973-1982 inflation-shock)
- Historical values may not reflect future relationship between variables
- Choice of historical period is arbitrary

Transitions: Using fixed transition periods

PRO

- Simple and transparent rule
- Consistent treatment of all variables
- Eliminate opportunity for “gaming” transition period

CON

- Length of transition period is arbitrary
- May not be consistent with length of historical transition
- May bias choice of ultimate rates due to unrealistic speed of convergence

Key Variables: Explicit and Implicit

- **Transparency:** Which assumptions are not explicitly highlighted and evaluated separately? How do these assumptions affect the results? (e.g. earnings distribution, taxation of benefits)
- **Consistency:** Are related assumptions internally consistent? (e.g. educational attainment, labor force participation, marriage and fertility)
- **Accountability:** Compile and maintain list of historical assumptions. Which assumptions changed, how much, and when?

Key Variables: Implicit and Explicit

(Variables in Red are not explicitly highlighted in Trustees' Report)

Economic	Demographic	Programmatic
Labor Productivity* Hours Worked Labor Share Taxable Ratio Earnings Inequality (Gini & Gender) Real Wage Differential	Immigration (In and Out) Legal Permanent Resident (LPR) Other than LPR Adjustment of Status Duration of Stay Relative Earnings	Insured Status (OASI and DI) Disability Incidence Rate Termination Rate Recovery Rate
Consumer Price Index GDP Deflator	Marriage and Divorce Rate Duration of Marriage Assortative Mating	Retirement Decisions Early or Delayed Spousal, Worker, or Survivor
Nominal Interest Rate Yield Curve and Term Structure Real Interest Rate	Mortality Rate Differential by AIMEs	Income Tax Rates and Brackets Non-Social Security income
Labor Force Participation Rate Unemployment Rate	Fertility Rate Convergence of Foreign Born	Fringe Benefits and employer contributions to Social Insurance

Clarity and Relevance: Replacement Rates

- Replacement Rates (Benefit/Earnings) were removed from the 2014 and subsequent Trustees' Reports due to concerns over how to define the denominator (lifetime earnings, highest earnings, final earnings).
- The denominator issue has not been resolved.
- But there are several other areas of concern:
 - The use of single workers, rather than married workers, which excludes spouse and survivor benefits.
 - The use of pre-tax earnings and benefits, rather than after-tax.
 - The use of relative (AWI) earnings, rather than constant (CPI) earnings.

Presentation of Replacement Rates

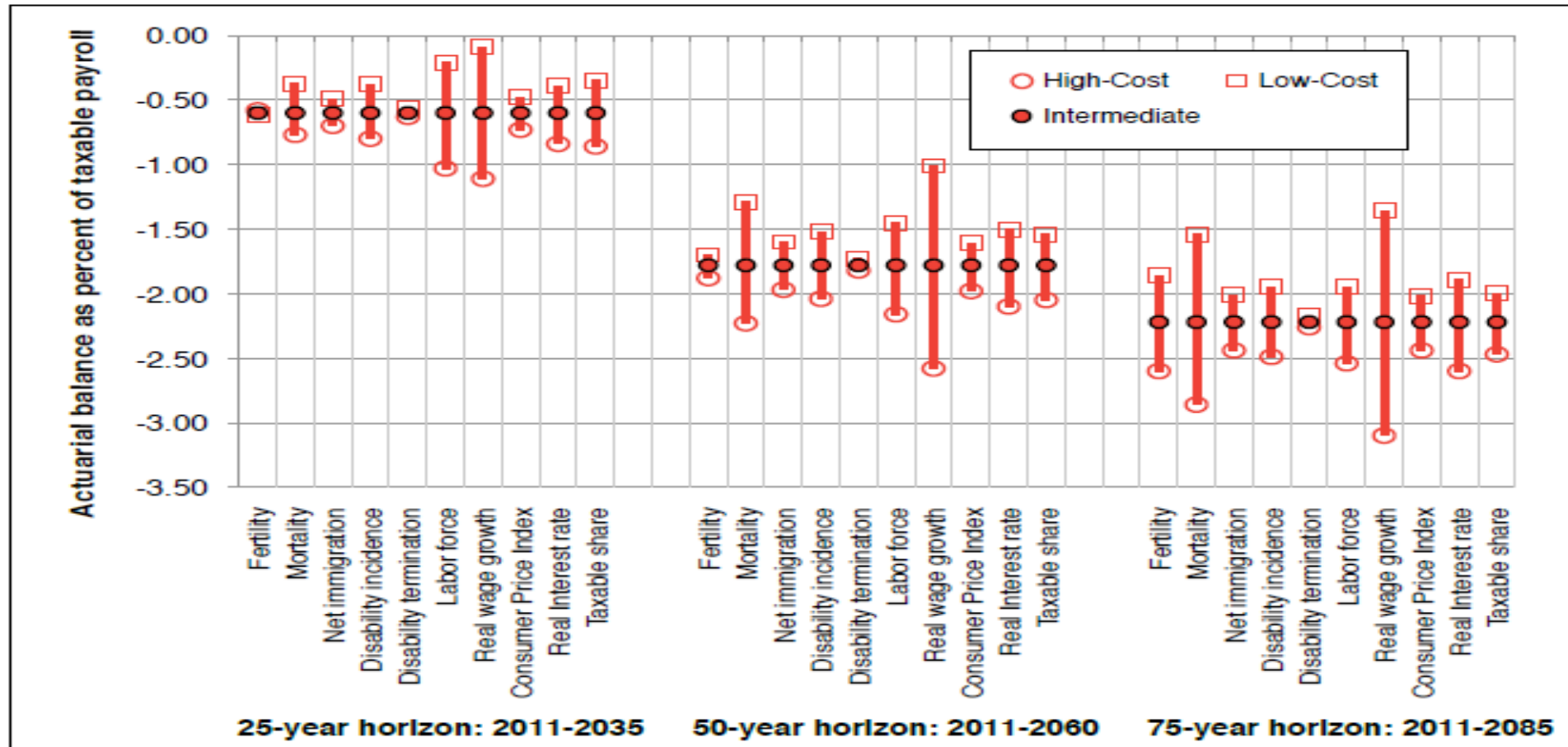
Year Age 62	2015	2045	2085	
Wages	Replacement Rates at Full Retirement Age (FRA)			Percent Change
<u>% of AWI</u>	<u>Relative (AWI) Earnings</u>			
25%	70%	73%	74%	+5%
50%	49%	51%	51%	+5%
100%	38%	40%	40%	+5%
200%	28%	29%	29%	+5%
<i>AWI at FRA</i>	<i>\$52,062</i>	<i>\$75,965</i>	<i>\$118,316</i>	<i>+127%</i>
<u>2015 \$s</u>	<u>Constant (CPI) Earnings</u>			
\$13,000	70%	80%	81%	+15%
\$26,000	49%	61%	80%	+63%
\$52,000	38%	45%	54%	+42%
\$104,000	28%	36%	42%	+50%

Clarity and Relevance: Uncertainty

- The degree of uncertainty depends on the relative impact of each variable and its potential range of variation.
- Several important variables are not included in current presentation of sensitivity analysis. (e.g. labor force participation rate)
- High/Low scenarios may not reflect the most likely range of outcomes given the historical relationships between variables.
 - High cost: All variables move in the direction of increasing costs
 - Low cost: All variables move in the direction of decreasing costs

Presentation of Uncertainty: Sensitivity Analysis

Figure 4. Sensitivity of Summarized Actuarial Balance to Range of Assumptions: 25-, 50-, and 75-Year Horizons (as a Percent of Taxable Payroll)⁴



Source: 2011 Trustees Report, Appendix D; additional estimates provided by Office of the Chief Actuary, Social Security Administration.

Presentation of Uncertainty: Stochastic vs. High/Low Scenarios

Figure VLE3.—OASDI Cost Rates: Comparison of Stochastic to Low-Cost, Intermediate, and High-Cost Alternatives
[As a percentage of taxable payroll]

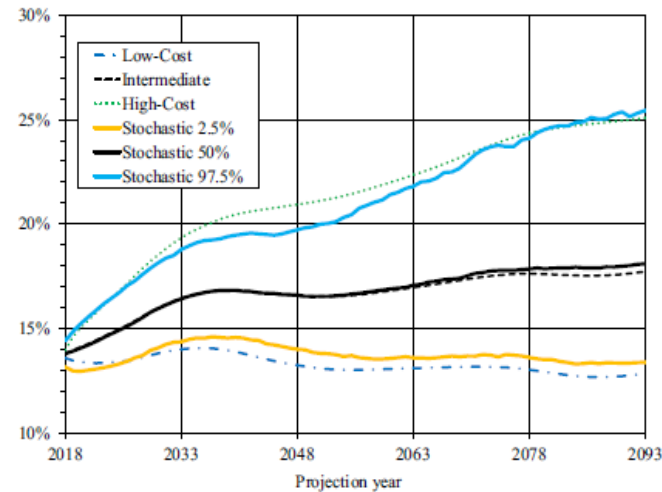


Figure IL.D6.—Long-Range OASI and DI Combined Trust Fund Ratios Under Alternative Scenarios
[Asset reserves as a percentage of annual cost]

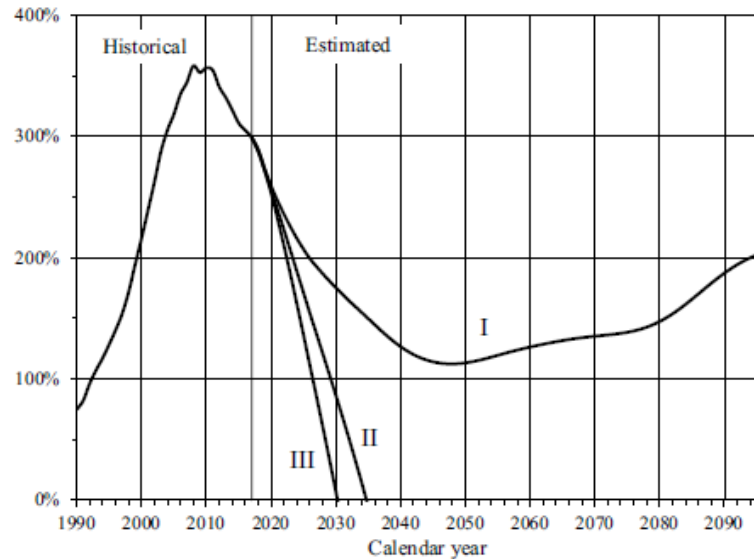
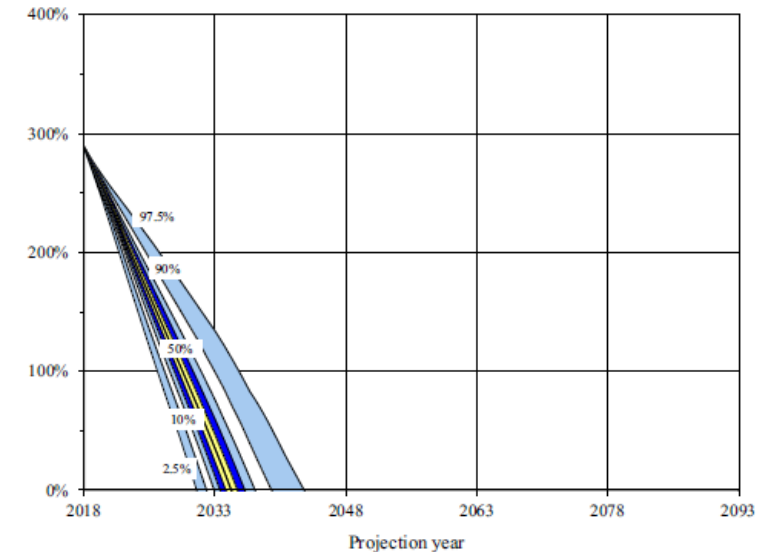


Figure IL.D7.—Long-Range OASI and DI Combined Trust Fund Ratios From Stochastic Modeling



Presentation of Uncertainty: Stochastic analysis

- Previous TPAMs have recommended making stochastic and alternative projections more consistent, but have not examined the stochastic model itself.
- Differences between Stochastic and High/Low Scenarios
 - Range of annual program costs is roughly consistent (see charts on next slide)
 - Stochastic model gives wider short-run trust fund ratios and narrower long-run ratios
 - Incorporating greater uncertainty in the stochastic model would expand long-run ratios*
- OCACT's stochastic model is based on vector auto-regression (VAR) that links the inflation rate, interest rate and unemployment rate as lagged independent variables. Other economic and demographic variables are modeled separately.
 - Do models with linked-variables perform better than models with separate variables?
 - Are there practical limits (e.g. complexity, overfitting) to the number of linked-variables?
 - Can Bayesian analysis reliably “solve” these problems?

Clarity and Relevance: Federal Budget Perspective

- The OASDI Trustees' Reports from 1991 through 2006 discussed the general revenue impact of trust fund operations on the federal budget.
- This discussion was incrementally removed from 2007 to 2010, until a footnote was added in 2016 referring readers to an Appendix in the Medicare Trustees' Report.
- The addition of the footnote prompted OCACT to criticize the Medicare report in the OASDI statement of actuarial opinion which contends such views are "inconsistent" with the statutory requirement to report on the "actuarial status" of the program.
- Actuarial status is not defined and the content of Trustees' Report is not limited by statute.
- Consistency with current law would require recognition of the statutory debt limit which would preclude future trust fund accumulation and the chained-CPI indexing of income taxes which would substantially increase future revenue.

Presentation of Federal Budget Perspective

- Currently, the excess of tax income to the OASI Trust Fund over the fund's expenditures is borrowed by the general fund, resulting in a substantial net cash flow to the general fund.... this cash flow will reverse sometime in the next 10-20 years. Thereafter, increasingly larger amounts will be needed from trust fund assets to meet benefit payments and other expenditures. **Revenue from the General Fund of the Treasury will be drawn upon to provide the necessary cash.** The accumulation and subsequent redemption of substantial trust fund assets has important public policy and economic implications that extend well beyond the operation of the OASDI program itself. [TR 2006]
- Therefore, the actual operations of the trust funds under current law do not draw on other Federal resources. Expenditures can only be paid from current or deferred earmarked resources for the specific program financed from the trust fund. **Assertions that trust fund reserve redemption and shortfalls after reserve depletion represent draws on other Federal resources are based on assumptions that are inconsistent with the law and with actual trust fund annual cash-flow operations.** [TR 2018 – Statement of Actuarial Opinion]

Other Topics to Consider

- Labor Force Participation
 - Effects of education, opioids, disability
- Earnings Inequality
 - Distribution of Earnings below Taxable Maximum
- Fertility Rates
 - Expectations vs. Realizations
 - Educational Attainment and Marital Status
- Taxation of Social Security Benefits
 - AWI vs. Chained-CPI (Public Law 115-97)

Labor force participation rates

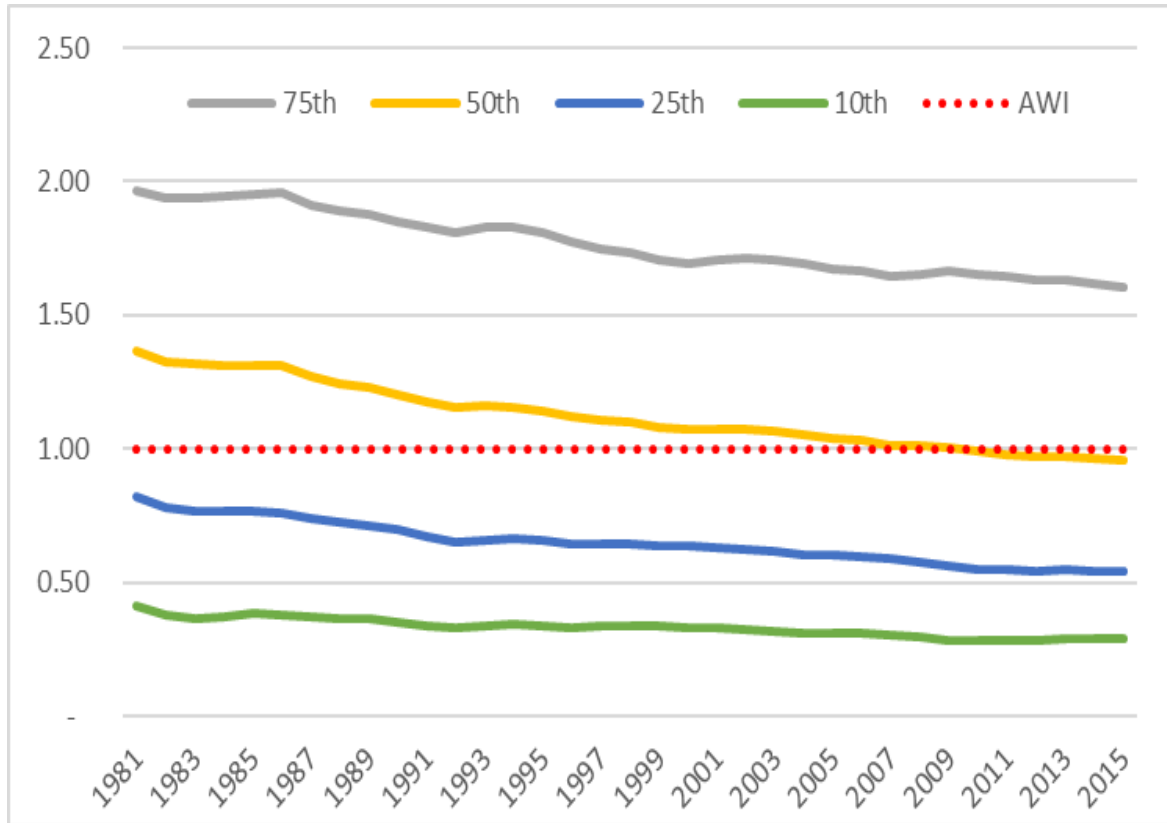
LFP rates reviewed by 2015 Technical Panel and 2017 special panel, but issues remain:

- Pre-recession trends at some ages are not yet fully explained
- Rebound from the recession? OCACT assumes LF recovery not complete.
- How should education trends be incorporated?
- Augment the business cycle effect with a disability application effect?
- Opioids:
 - Causation can run both ways: opioid use might decrease participation (Krueger 2017), and low employment might increase opioid use (Ruhm 2018)
 - Does current modeling (disability, mortality) already implicitly include such effects?
- Disability: Varying estimates of the role of disability in the 8 percentage point decline in male prime-age LFP since 1976 (estimates from 1/4th to 1/16th)

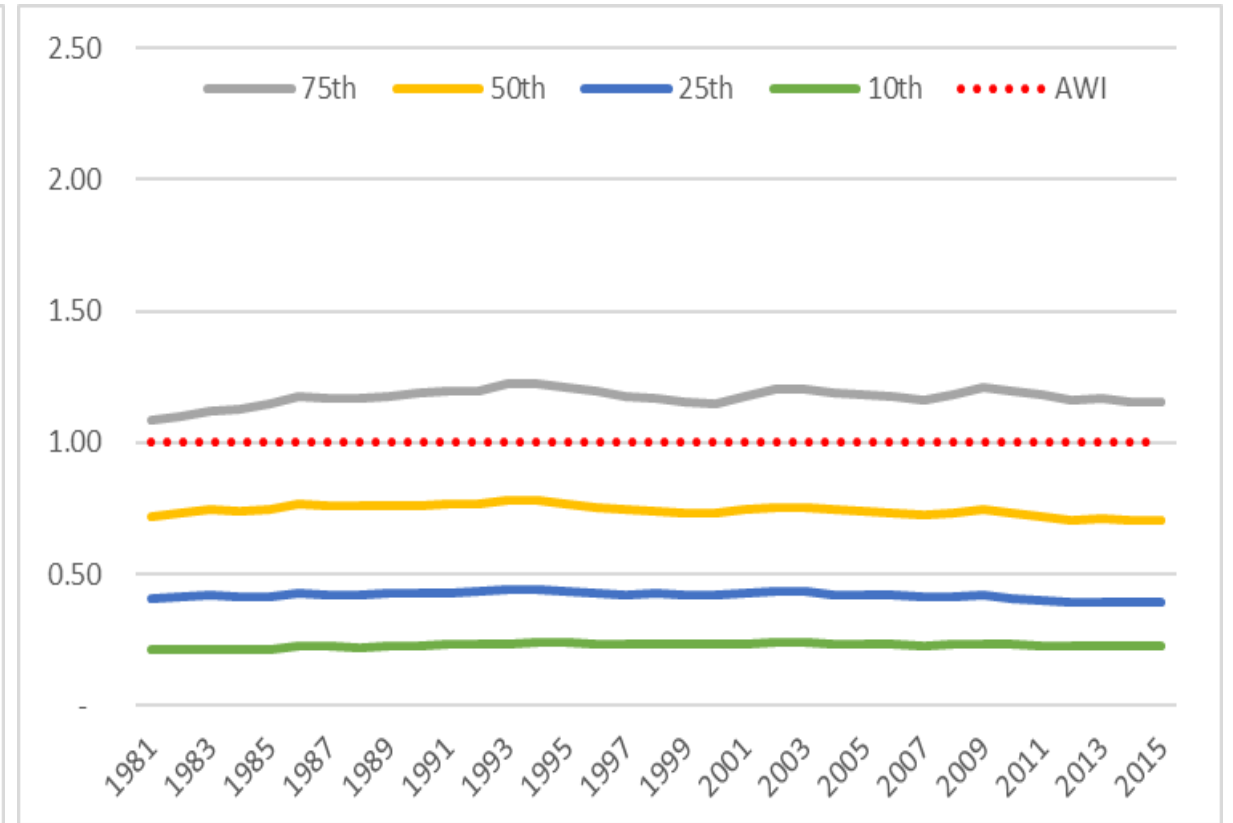
Earnings Inequality:

Results in Lower Payroll Taxes and Higher Replacement Rates

Annual Earnings of Men as Percent of AWI

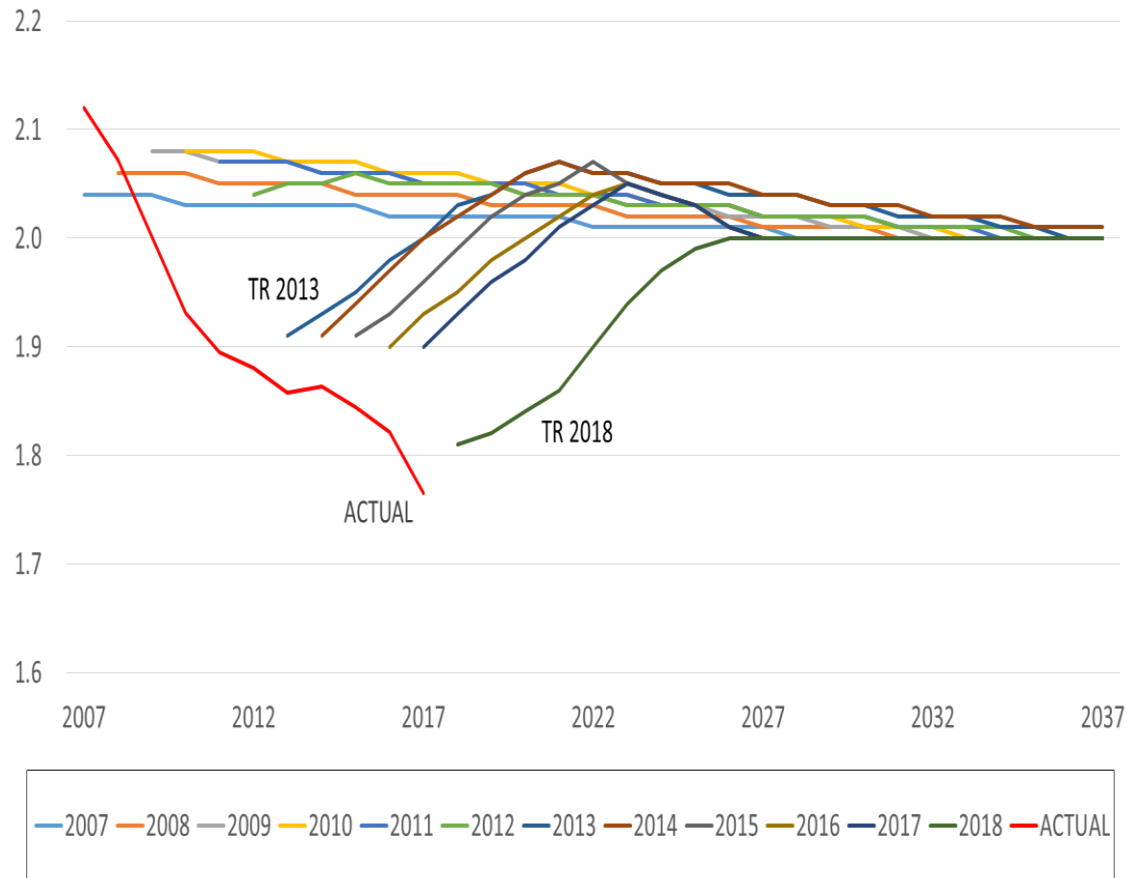


Annual Earnings of Women as Percent of AWI

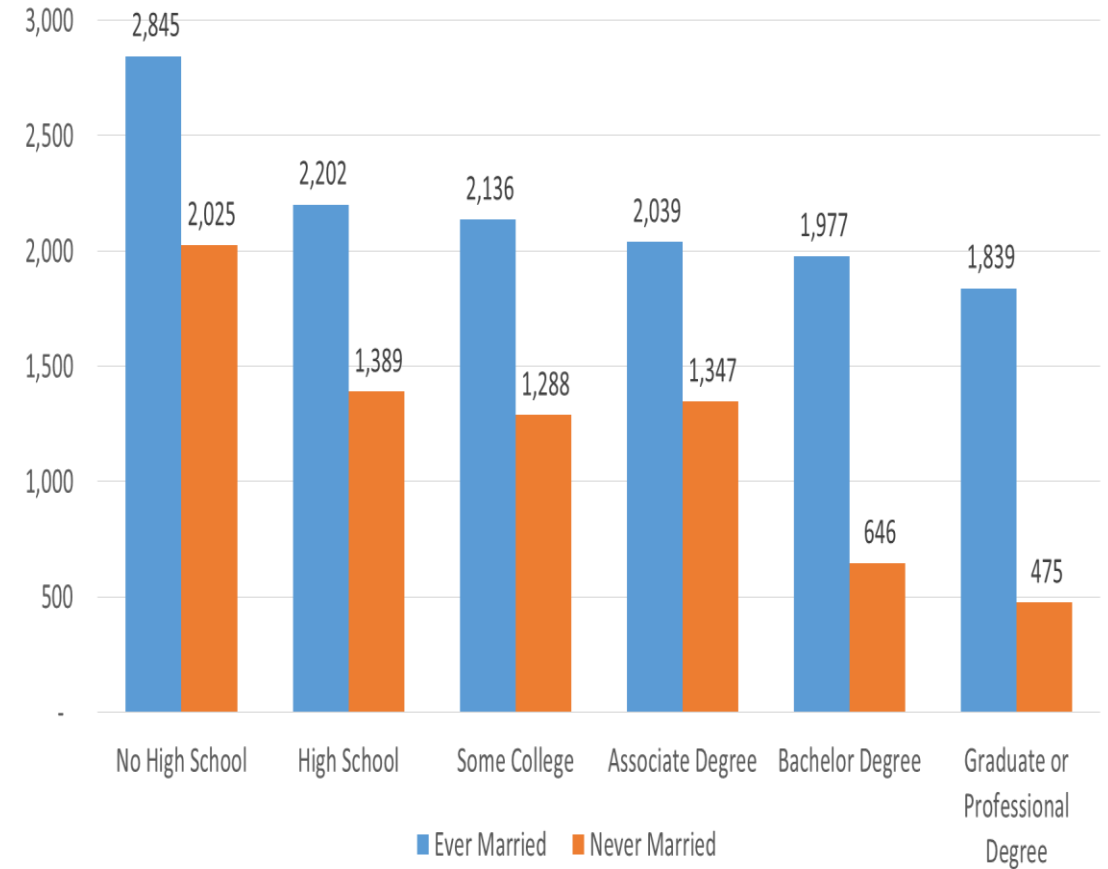


Fertility Rates by Education and Marital Status

Total Fertility Rate: Actual vs. Projected (TR 2007-2018)



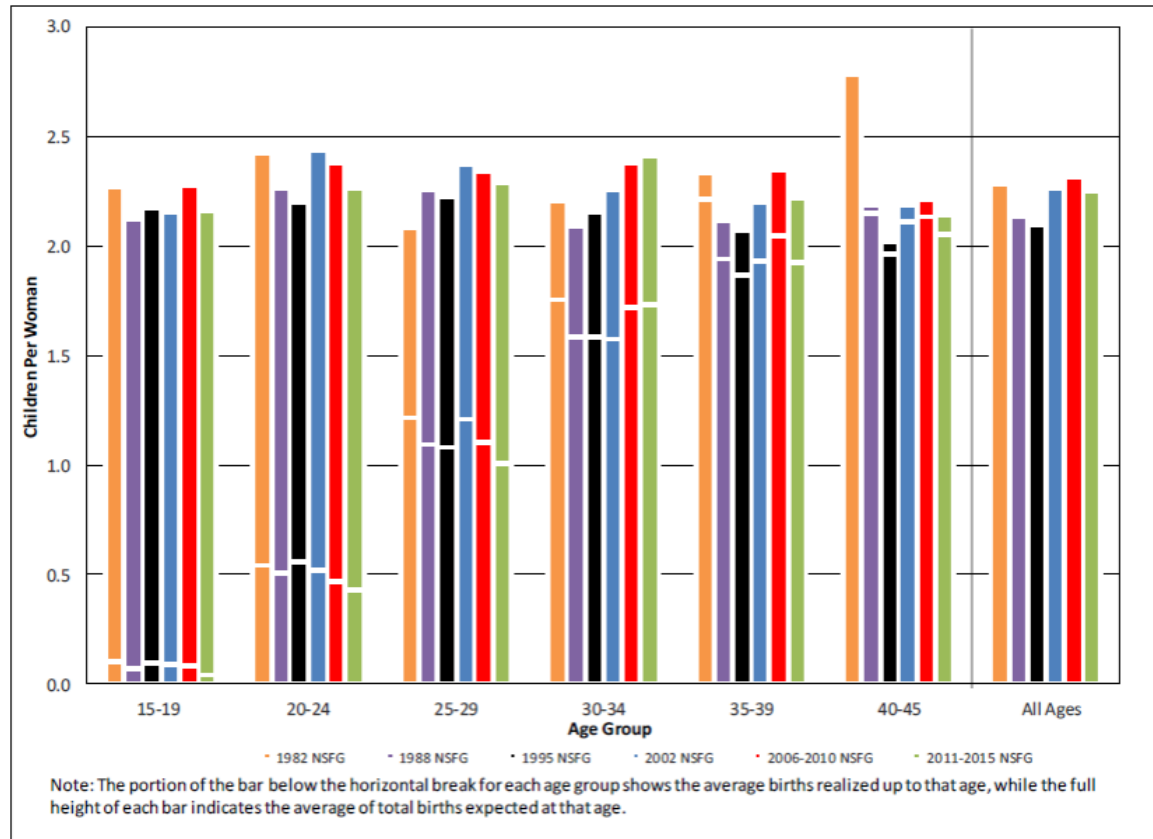
Children Ever Born per 1,000 Women Ages 40-50 (2016)



Fertility Expectations

Survey says birth expectations >2 but those who delay marriage are more likely to fall short

Chart 1.5: Past and Future Expected Births per Woman Based on the National Survey of Family Growth (NSFG)



Distribution of Actual Births by Intended Births							
Actual Births (Ages 41-50)	Intended Births (Ages 23-25)						TOTAL
	0	1	2	3	4	5+	
0	4%	2%	8%	2%	1%	0%	17%
1	1%	4%	8%	2%	1%	0%	16%
2	1%	3%	24%	6%	2%	0%	36%
3	0%	1%	7%	9%	2%	0%	20%
4	0%	0%	2%	3%	2%	0%	8%
5+	0%	0%	1%	1%	1%	1%	3%
TOTAL	6%	11%	50%	23%	8%	2%	44%

Source: NLSY (1957-1964 Birth Cohort) n=3,783 in 2006

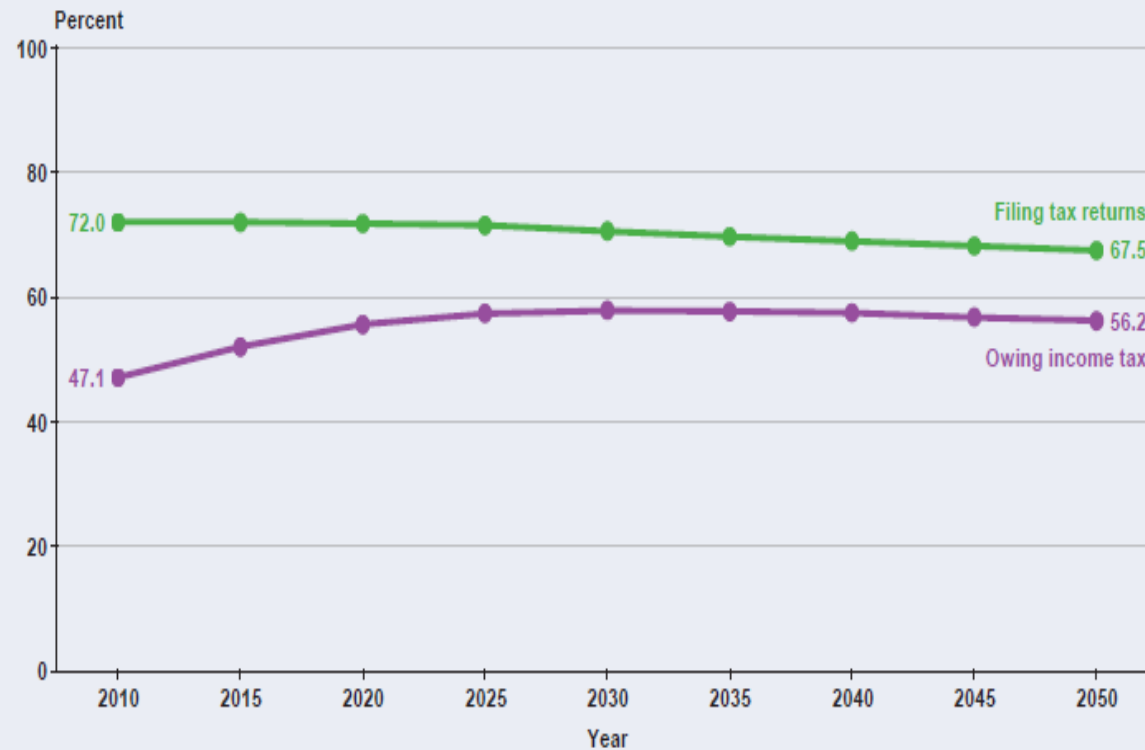
Source: OCACT (NSFG 1982-2015) and Morgan, S.P. and Rackin, H. "The Correspondence Between Fertility Intentions and Behavior in the United States, Population and Development Review, 36(1): 91-118, March 2010

Taxation of Social Security Benefits

Trustees' Report assumes Income Taxes are indexed to AWI instead of Chained-CPI

Percent of Beneficiaries who File an Income Tax Return

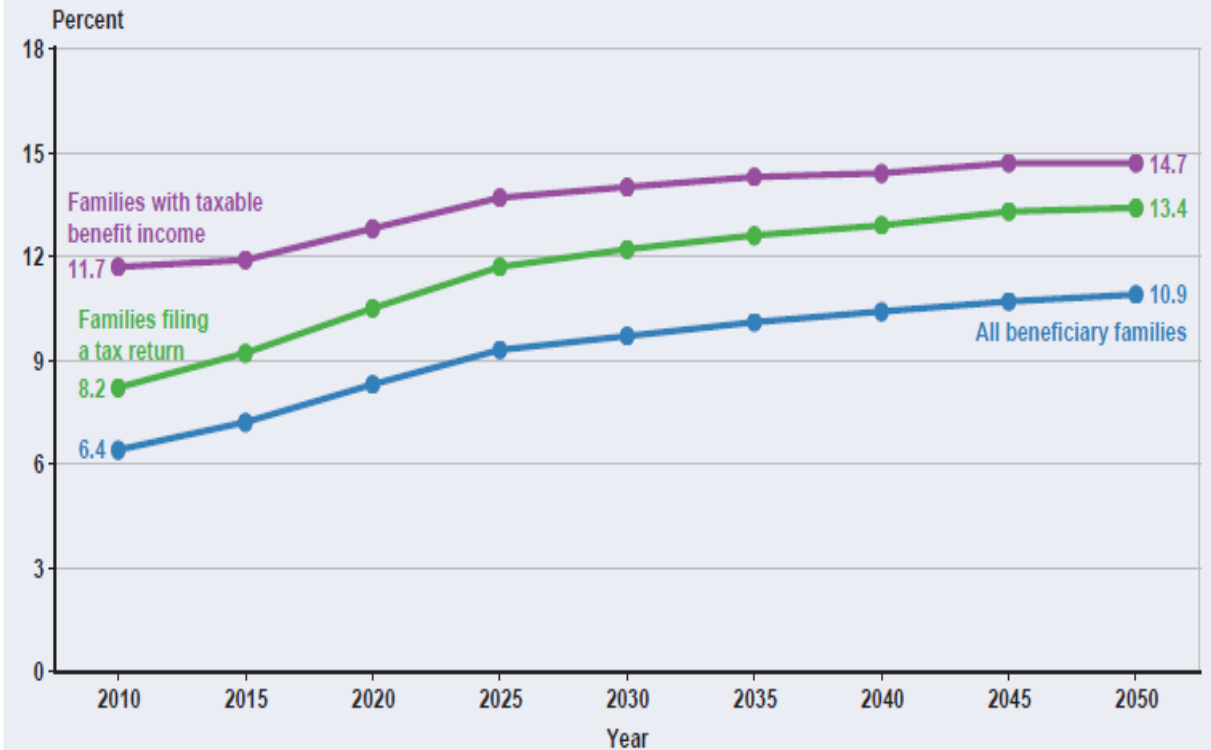
Chart 1.
Percentages of Social Security beneficiaries filing income tax returns and owing income tax on their benefits, 2010 and projected quinquennially 2015–2050



SOURCE: Author's calculations using MINT7.

Average Income Tax Rate on Beneficiaries

Chart 2.
Mean percentage of Social Security benefit income owed as income tax: Three beneficiary-family categories, 2010 and projected quinquennially 2015–2050



SOURCE: Author's calculations using MINT7.

Concluding Recommendations

- Compare past projections with actual results (including a decomposition of sources of error) as a part of the TPAM evidence building process.
- Compare recommendations with current practice, not in isolation. A new approach may have flaws but still perform better than current methods.
- Evaluate assumptions based on relevant data and theory, and avoid “down-weighting” recommendations based on “political” concerns over impact on Trust Fund solvency.
- Evaluate options to identify consistent approach to determine optimal values for ultimate assumptions (e.g. length of historical period used) and exceptions (e.g. business cycle) or weighting.
- Evaluate interactions between assumptions to improve internal consistency and assess relative merits of a “holistic” vs. “single variable” approach to choosing ultimate assumptions.
- Evaluate length of transition periods and assess need for consistency among variables to improve transparency and prevent “gaming.”
- Evaluate trade-offs between the transparency of fixed transition periods with the empiricism of model-based transition periods.